

in 1876, mean, 11°.1. The mean temperature of 1886, 44°.8, is only 0°.2 lower than the normal of the past twenty-three years; in that time 1870 was the warmest year, mean temperature, 48°.1; 1875 was the coldest, mean, 41°.4.

Sycamore, DeKalb county: the mean temperature of 1886, 45°.2, coincides with the annual mean of the past five years. The temperature of the present December, 17°.0, is lower than that of any other December during the past six years; in that time the warmest December occurred in 1881, mean, 34°.8.

Sandwich, DeKalb county: the mean annual temperature of the past thirty-five years is 47°.8, the mean of 1886 is 48°.7, being 0°.9 above the normal; the maximum temperature of the past thirty-five years is 105°.0, the minimum is -34°.0; the maximum of 1886 is 99°.0, the minimum is -25°.0.

Indiana.—Logansport, Cass county: the highest December temperature since the beginning of observations in 1854, 72°.0, occurred in 1875, the lowest, -22°.0, in 1872; the highest mean temperature for that month, 45°.0, occurred in 1877; the lowest, 14°.0, in 1872; greatest monthly range, 79°.0, in 1870; least monthly range, 38°.0, in 1857; the highest temperature during 1886, 103°.0, occurred July 7th, the lowest, -17°.0, January 10th; the mean temperature for the year is 51°.6.

Vevay, Switzerland county: the three highest temperatures that have occurred in December during the past twenty-one years are 76°.0 in 1865, 73°.0 in 1875, 72°.0 in 1867; the three lowest are -11°.0 in 1880, -7°.0 in 1871 and 1876.

Iowa.—Muscatine, Muscatine county: the present December is the coldest that has occurred during the past forty-seven years; it is 13°.2 below the normal and 3°.8 below the mean of December, 1872, which is second to the present December in point of low temperature; the minimum temperature of the month, -26°.0, was reached but once before, viz., in 1872.

Monticello, Jones county: the mean temperature of the year, 45°.9, is 0°.4 below the normal of the past thirty-two years; during December since 1854 the maximum temperature, 64°.0, occurred in 1877; the minimum, -36°.0, in 1872; the warmest December mean temperature, 39°.5, occurred in 1877; the coldest mean, 8°.1, in 1859.

Kansas.—Lawrence, Douglas county: the following table, by Prof. F. H. Snow, furnishes a comparison with the eighteen preceding Decembers:

	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
Mean temp.....	23.9	29.6	28.4	24.4	19.8	31.1	30.8	39.4	23.6	44.4
Max. temp.....	53.0	65.0	64.0	58.0	58.5	67.5	55.5	73.0	66.0	68.0
Min. temp.....	-16.0	4.0	-10.0	-6.0	-18.0	9.0	-3.0	0.0	-5.0	10.0

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	Mean.
Mean temp.....	23.0	26.2	25.8	40.1	31.2	33.7	23.5	32.5	24.0	29.2
Max. temp.....	53.0	65.5	61.0	63.0	58.0	63.0	59.5	57.0	58.0	61.4
Min. temp.....	-6.0	-9.0	-12.0	13.0	-6.5	3.5	-6.5	-1.5	-6.0	-3.3

Maine.—Cornish, York county: during the past twenty-nine years the coldest December occurred in 1859, mean temperature, 14°.7; the warmest in 1877, mean, 27°.5.

Massachusetts.—Somerset, Bristol county: the mean temperature of 1886, 50°.2, is 0°.7 above the average of the past sixteen years.

Worcester, Worcester county: the mean temperature of 1886 was 45°.1 against 44°.0 and 45°.8 the two preceding years. The extremes of temperature were -9°.0, February 7th, which was the coldest day of the year (with a mean temperature of -4°.5) and 89°, on July 6th and 7th, the latter being the warmest day, with a mean temperature of 78°.7. The extremes of temperature during the last half century are, the minimum, -18°.5, on February 8, 1861, and the maximum, 98°, on June 22, 1849. The coldest day during the period was February 5, 1855, when the extremes were -7° and -14°, with a mean temperature of -11°.2. The warmest day during the same period was July 13, 1849, when the extremes were 78° and 95°, with a mean temperature of 89°.2.

New York.—North Volney, Oswego county: during the past nineteen years the coldest December occurred in 1876, mean temperature, 18°.0; the warmest in 1881, mean, 33°.7; the mean temperature of 1886, 45°.1, is 0°.3 above the average of the past nineteen years.

Palermo, Oswego county: the highest December mean temperature during the past thirty-three years, 32°.1, occurred in 1881; the lowest mean, 16°.8, in 1880; the mean temperature of the year 1886, 42°.7, is 4°.2 below the average of the past thirty-three years; the highest yearly mean in that time, 51°.8, occurred in 1878.

Ohio.—Wauseon, Fulton county: during the past sixteen years the highest December mean temperature, 38°.8, occurred in 1877; the lowest, 17°.1, in 1872; the December extremes for the same period are 70°.0 in 1875 and -32°.4 in 1884; the mean temperature of the year 1886, 47°.4, is 0°.3 below the average.

Texas.—New Ulm, Austin county: temperature comparisons for December during the past fourteen years: highest mean, 60°.9, in 1875; lowest mean, 46°.1, in 1876; highest temperature, 86°.0, in 1875; lowest, 9°.0, in 1880.

Virginia.—Dale Enterprise, Rockingham county: the highest December mean temperature recorded at this place within the past six years, 51°.4, occurred in 1880; the lowest, 28°.4, in 1882. The table below gives the maxi-

mum, minimum, and annual mean temperature of each year from 1880 to 1886, inclusive:

Years.	Temperature.		
	Maximum of the year.	Minimum of the year.	Annual means.
1880.....	100	-17	55.4
1881.....	99	-13	55.2
1882.....	97	5	53.6
1883.....	98	0	55.0
1884.....	97	-3	53.2
1885.....	100	-10	53.2
1886.....	95	-12	55.7
Means.....	98	-7	54.6

Bird's Nest, Northampton county: during the past eighteen years the lowest December mean temperature, 32°.7, occurred in 1876.

Wytheville, Wythe county: during the past twenty-two years one December only, that of 1878, was colder than the present month.

Variety Mills, Nelson county: the mean temperatures of December, 1886 and 1876, were each 30°.3, and were lower than the mean of any other December in the past ten years; the highest mean in that time, 43°.3, occurred in 1879; the mean temperature for 1886, 52°.5, is 2°.7 below the average of the previous nine years, and it is also the lowest annual mean that has occurred in that time; 1877 and 1881 were the warmest, annual temperature for each, 56°.5; the maximum temperature of the year 1886, 93°.0, occurred July 30th; the minimum, -15°.6, on February 5th.

West Virginia.—Helvetia, Randolph county: the mean temperature of the year, 48°.9, is 1°.4 below the average of the last ten years.

FROSTS.

Frost occurred in the various districts on the following dates:

New England.—1st to 31st.

Middle Atlantic states.—1st to 31st.

South Atlantic states.—1st to 12th, 14th to 31st.

Florida Peninsula.—3d, 6th, 7th, 8th, 15th, 16th, 17th, 20th, 21st.

East Gulf states.—2d to 8th, 13th, 14th, 16th, 17th, 20th to 23d, 25th, 27th.

West Gulf states.—1st, 2d to 7th, 9th, 14th, 15th, 16th, 18th to 22d, 24th to 27th, 31st.

Rio Grande Valley.—5th, 6th.

Tennessee.—1st to 11th, 13th to 31st.

Ohio Valley.—1st to 22d, 24th to 31st.

Lower lake region.—1st to 31st.

Upper lake region.—1st to 31st.

Extreme northwest.—1st to 31st.

Upper Mississippi valley.—1st to 31st.

Missouri Valley.—1st to 31st.

Northern slope.—1st to 31st.

Middle slope.—1st to 31st.

Southern slope.—1st to 16th, 19th, 24th to 22d to 29th, 31st.

Southern plateau.—1st to 9th, 11th to 31st.

Middle plateau.—1st to 31st.

Northern plateau.—1st, 2d, 4th to 7th, 10th, 11th, 12th, 14th, 15th, 18th to 21st, 23d, 28th, 29th, 31st.

North Pacific coast region.—1st to 6th, 9th, 10th, 12th to 15th, 20th to 24th, 27th.

Middle Pacific coast region.—1st to 5th, 10th, 13th, 14th, 15th, 21st.

South Pacific coast region.—11th, 22d.

ICE.

Ice formed in the southern parts of the country, as follows:

Florida.—Jacksonville, 6th, 7th, 16th, 17th; Archer, 6th, 7th, 16th, 21st; Duke, 6th, 7th; Pensacola, 5th, 6th.

Georgia.—Savannah, 3d, 16th.

Louisiana.—New Orleans, 5th; Shreveport, 16th, 20th.

North Carolina.—Hatteras, 3d; Charlotte, 2d, 3d.

South Carolina.—Charleston, 16th, 17th.

Texas.—Palestine, 2d; Corsicana, 4th to 7th, 12th, 25th, 27th, 28th.

TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly

ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for December, 1886.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
Alpena, Michigan a.....	30.7	28.6	2.1	10.4	19.9
Augusta, Georgia.....	49.6	37.2	12.4	8.0	42.6
Baltimore, Maryland.....	44.5	34.1	10.4	11.9	31.3
Block Island, Rhode Island.....	48.5	35.2	13.3	8.3	34.0
Boston, Massachusetts.....	34.0	32.2	1.8	13.8	23.6
Buffalo, New York.....	49.7	46.2	3.5	15.4	47.5
Canby Fort, Washington Territory.....	62.1	49.6	12.5	7.7	54.4
Cedar Keys, Florida.....	55.0	48.0	7.0	36.5	48.4
Charleston, South Carolina.....	49.5	29.7	19.8	3.1	36.4
Chincoteague, Virginia.....	33.2	32.0	1.2	7.9	25.0
Chicago, Illinois.....	36.0	32.0	4.0	13.4	25.3
Cleveland, Ohio.....	35.6	34.1	1.5	10.6	8.9
Detroit, Michigan d.....	64.2	53.6	10.6	13.8	56.2
Duluth, Minnesota e.....	32.9	32.0	0.9	17.6	22.5
Escondido, Texas.....	59.0	51.6	7.4	18.0	52.8
Galveston, Texas.....	76.5	65.0	11.5	18.4	67.5
Grand Haven, Michigan f.....	36.6	32.8	3.8	9.3	22.6
Jacksonville, Florida.....	56.9	44.7	12.2	14.7	45.2
Key West, Florida.....	35.2	31.4	3.8	11.7	15.6
Mackinaw City, Michigan g.....	56.9	44.7	12.2	14.7	45.2
Macon, Fort, North Carolina.....	47.0	37.5	9.5	11.4	29.9
Marquette, Michigan h.....	45.3	34.8	10.5	14.9	30.8
Mobile, Alabama.....	46.3	29.8	16.5	16.3	37.7
New London, Connecticut.....	67.1	50.9	16.2	16.9	51.3
New York City.....	42.9	30.0	12.9	17.4	23.1
Norfolk, Virginia.....	47.9	44.2	3.7	52.6	45.5
Pensacola, Florida.....	52.6	51.7	0.9	37.5	53.1
Portland, Maine.....	53.8	42.5	11.2	10.3	48.5
Portland, Oregon.....					
Sandusky, Ohio d.....					
San Francisco, California.....					
Savannah, Georgia.....					
Toledo, Ohio d.....					

a Frozen from 2d to 6th and from 16th to 31st.

b Frozen, 5th to 10th and from the 17th to 31st.

c Frozen 5th, 6th, 7th, and from 27th to 31st.

d Frozen throughout the month.

e Frozen from 5th to 31st.

f Frozen from 27th to 31st.

g Frozen 2d, 3d, 4th, and from the 15th to 31st.

h Frozen from 18th to 24th and from 26th to 31st.

PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for December, 1886, as determined from the reports of about five hundred and eighty stations, is exhibited on chart iii.

The precipitation of December, 1886, is nearly normal in all parts of the country, except in the Gulf and south Atlantic states and along the Pacific coast. In the Gulf and south Atlantic states the precipitation of the month is largely below the normal; within these districts three stations only, Charlotte, New River, and Wilmington, North Carolina, show an excess of precipitation; at all other stations the monthly precipitation ranges from one-half to one-seventh of the normal. The average precipitation for December, 1886, at Signal Service stations in the east Gulf states is only one-half the normal, and in the west Gulf states the average is less than one-third of the normal. Along the coast of Washington Territory and Oregon very large departures in excess of the normal occur, and in California large deficiencies. The rainfall of the western part of Washington Territory and Oregon deserves special mention, several stations reporting over fifteen inches; at Neah Bay, Washington Territory, 30.70 inches of rain fell, and at Tatoosh Island, Washington Territory, 25.84, which is 14.82 in excess of the normal.

The following are some of the most marked departures from the normal precipitation at Signal Service stations:

Above normal.		Below normal.	
	Inches.		Inches.
Tatoosh Island, Washington Ter.....	14.82	Shreveport, Louisiana.....	4.81
Olympia, Washington Territory.....	4.19	Little Rock, Arkansas.....	4.08
Portland, Oregon.....	3.37	Vicksburg, Mississippi.....	3.91
Eastport, Maine.....	2.51	Los Angeles, California.....	3.41
Block Island, Rhode Island.....	2.08	Palestine, Texas.....	3.10
Coeur d'Alene, Idaho.....	1.94	San Francisco, California.....	2.86

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows, for certain stations, as reported by voluntary observers, the average precipitation for the month of December for a series of years, the precipitation for December, 1886, and the departures from the average:

Station.	County.	Average precipitation for Dec.	Number of years.	Precipitation for Dec., 1886.	Departure.
		Inches.		Inches.	Inches.
Lead Hill.....	Arkansas.	4.78	5	1.51	- 3.27
Full Brook.....	California.	2.42	10	0.30	- 2.12
Sacramento.....	Sacramento.....	4.60	21	2.13	- 2.47
Canton *.....	Connecticut.	3.63	25	2.71	- 0.92
Hartford *.....	Hartford.....	3.65	15	4.64	+ 0.99
Middletown *.....	Middlesex.....	3.74	28	5.72	+ 1.98
Wallington *.....	New Haven.....	4.18	28	6.77	+ 2.59
Anna.....	Illinois.	3.25	11	3.25	0.00
Mattoon.....	Colo.	3.21	6	1.88	- 1.33
Peoria.....	Peoria.....	2.41	30	0.89	- 1.52
Riley.....	McHenry.....	2.00	26	1.13	- 0.87
Sycamore.....	De Kalb.....	2.75	6	1.45	- 1.30
Lafayette.....	Indiana.	3.02	7	1.96	- 1.06
Logansport.....	Tippecanoe.....	2.52	32	0.85	- 1.67
Vevay.....	Switzerland.....	4.12	21	2.89	- 1.23
Monticello.....	Iowa.	2.40	33	0.84	- 1.56
Independence.....	Kansas.	2.39	14	0.65	- 1.74
Lawrence.....	Montgomery.....	1.63	19	0.83	- 0.80
Wallington.....	Douglas.....	0.98	8	0.08	- 0.90
Yates Centre.....	Sumner.....	1.45	7	0.49	- 0.96
Grand Coteau.....	Woodson.....	6.76	3	3.26	- 3.50
Gardiner *.....	Louisiana.	3.70	48	4.68	+ 0.98
Orono *.....	Maine.	3.98	18	6.38	+ 2.40
Fallston.....	Maryland.	3.52	16	4.22	+ 0.70
Cambridge *.....	Massachusetts.	3.71	46	5.04	+ 1.33
Chestnut Hill *.....	Middlesex.....	3.35	11	5.82	+ 2.47
Framingham *.....	Middlesex.....	3.47	12	5.17	+ 1.70
Lake Cochituate *.....	Middlesex.....	3.51	35	5.67	+ 2.16
Lowell *.....	Middlesex.....	3.25	62	4.94	+ 1.69
Lynn *.....	Essex.....	2.76	12	5.75	+ 2.99
Mystic Lake *.....	Middlesex.....	3.01	11	4.68	+ 1.67
New Bedford *.....	Bristol.....	4.12	74	6.78	+ 2.66
Somerset.....	Bristol.....	3.24	16	5.54	+ 2.30
Springfield *.....	Hampden.....	3.51	39	3.76	- 0.25
Waltham *.....	Middlesex.....	2.95	61	6.25	+ 3.30
Williamstown *.....	Berkshire.....	2.63	18	4.04	+ 1.41
Carson City.....	Nevada.	2.00	8	0.72	- 1.28
Saint John *.....	New Brunswick.	4.67	26	6.81	+ 2.14
Concord *.....	New Hampshire.	2.87	30	3.30	+ 0.43
Hanover *.....	Grafton.....	2.08	21	1.99	- 0.09
South Orange.....	New Jersey.	3.75	17	3.55	- 0.20
Factoryville.....	New York.	1.41	5	0.77	- 0.64
Palermo.....	Ohio.	3.97	33	2.97	- 1.00
Waukegan.....	Pennsylvania.	2.32	14	3.07	+ 0.75
Dyberry.....	South Carolina.	2.54	18	2.32	- 0.22
Stateburg.....	Texas.	3.41	6	2.56	- 0.85
New Ulm.....	Vermont.	4.59	14	0.97	- 3.62
Lunenburg *.....	Essex.....	2.94	38	3.40	+ 0.46
Newport *.....	Orleans.....	2.93	12	2.81	- 0.12
Stratford.....	Orange.....	3.20	12	2.70	- 0.50
Bird's Nest.....	Northampton.....	3.70	18	5.25	+ 1.55
Dale Enterprise.....	Rockingham.....	3.17	6	4.15	+ 0.98
Variety Mills.....	Nelson.....	3.77	8	3.06	- 0.71
Wythville.....	Wythe.....	2.94	22	3.35	+ 0.41
Helvetia.....	West Virginia.	4.51	10	4.57	+ 0.06

* From the "Bulletin of the New England Meteorological Society."

The following notes on the precipitation of December and the year 1886 are given by voluntary observers:

Illinois.—Riley, McHenry county: during the past twenty-six years the December precipitation was the greatest in 1863, total for month, 4.16; it was least in 1874, total, 0.48; during 1886 rain fell on eighty-one days, snow on forty-three days; total precipitation of the year, 31.24, which is 2.94 below the average of the past twenty-five years; in that time the largest annual precipitation occurred in 1881, total, 47.22; the least in 1874, total, 24.86.

Sandwich, DeKalb county: the precipitation of 1886, 27.41, is 13.20 below the average of the past thirty-five years; the precipitation of 1868, 1877, and 1878 is less than that of 1886, the fall for those years being respectively 28.75, 28.50, and 21.01.